

In Fig. 15, please amend reference numeral 29d, indicating the camera, to reference numeral 210d. and please amend reference numeral 29a, also indicating a camera, to reference numeral 210a.

A red marked-up version of the above Figures indicating the proposed amendments are also enclosed.

**In the Specification:**

**(1.) Please amend paragraph 13, page 4 as follows:**

*A1*  
[0013] One important feature of the invention is the ability to remotely monitor an area or an asset such as a commercial transport while on the ground, whether or not the commercial transport is attended. This will permit detection of unexpected events, breach of security, change in environmental conditions and other activities both on and in the vicinity of the commercial transport. A GPS or other location tracking system is included to provide accurate positioning information of the monitored zone or the specific commercial transport, establishing the geographic coordinates for the asset or event, and permitting the tracking of its movements, as well.

**(2.) Please amend paragraph 16, page 5 as follows:**

*A2*  
[0016] The selected personnel are then signaled by the security system of the present invention to respond. Audio, text and graphic communications may be utilized to inform the selected personnel of the condition and location. The system can also use its "mapping" function to assist the personnel in determining the best route to take in response. Because of the comprehensive nature of the system of the subject invention, both audio and image conditions of the transport can be communicated directly to the selected personnel, using video conferencing compression techniques of the LAN. If desired, the personnel can switch cameras to obtain different views, or gain control of the steerable camera disclosed herein and survey the scene as appropriate via remote control. The two-way communication conditions capability of the system would also permit the personnel to communicate conditions and the need for additional personnel or equipment both to the system computer and directly to other personnel.

**(3.) Please amend paragraph 18, page 5 as follows:**

**A3** [0018] It should be noted that the request for back-up can be programmed to be automatically activated under certain conditions. For example, if a security personnel personal system detects an explosion or a gunshot, an automatic alarm condition can be activated to alert central security and other personnel in the vicinity to an indicated "potential bomb blast" or "potential automatic weapon", all based on the audio signal which is picked up by the sensors by comparing them to known acoustic signatures of these types of events.

**(4.) Please amend paragraph 23, page 7 as follows:**

**A4** [0023] Situational awareness is also provided by the subject invention. In the preferred embodiment, all authorized personnel, monitored areas and assets are provided with a GPS location sensor or other location footprint, such that the home or ground crew will be able to track and identify the location of every component within the system. One benefit of this system is the ability to monitor and manage the traffic flow of the assets and personnel, assuring that proper distance is maintained and appropriate pathways are followed, as well as assuring that appropriate assets and personnel are in authorized areas at the appropriate time.

**(5.) Please amend paragraph 28, page 8 as follows:**

**A5** [0028] In its simplest form, current sensors are already on the commercial transport coupled with strategically based ground sensors and may be used to provide a surveillance and/or warning system. Thus, a basic system may be implemented with a minimum of alteration to the commercial transport and a minimum of expense.

**(6.) Please amend paragraph 31, starting on page 9 and ending on page 10, as follows:**

**A6** [0031] In the preferred embodiment, the system will transmit any detected information to a monitor system located at a ground control security station, typically located somewhere within the terminal, tower and/or safety sites such as security stations and fire stations. Detection of activity or fire can sound local and/or remote alarms and/or dial emergency numbers. The data may also be recorded on the standard recorders provided onboard the commercial transport and/or on ground based recorders of conventional type, digital type or a computer based logging system. The security station has instant live access to all of the image and/or audio signals as

*A6* they are captured by the sensors, and where used, the commercial transport recorder will make an historic record of the images for archive purposes. Where random access recording techniques are used, such as, by way of example, digital random access memory storage devices, the information can be readily searched for stored information.

**(7.) Please amend paragraph 32, page 10 as follows:**

*A7* [0032] If unauthorized personnel breach the security area and the audio and/or video equipment is activated, signals will be immediately transmitted to the security station. This will give immediate access to information identifying the activity and the personnel involved. Further, in the preferred embodiment of the invention, an alarm system will be activated for securing the immediate area and taking counter measures to tighten security such as remote operation of lights and doors, and respond to a breach of same.

**(8.) Please amend paragraph 33, page 10 as follows:**

*A8* [0033] In one embodiment, information from the plurality of sensors on the transport is synchronized through an on board capture/multiplexing system whereby the plurality of data, including visual image data, may be displayed, recorded, and/or transmitted in either a split screen or serial fashion. A "time-stamp" or chronology signal may also be incorporated in the data scheme. Any signal which is capable of being captured and stored may be monitored in this manner. Utilizing the wireless system of the invention in combination with the battery back-up power supply, it is possible to continue collecting information without using ground power or commercial transport power. This assures that the system will operate even if power is disrupted for any reason such as, by way of example, tampering by unauthorized personnel or by fire. In its simplest form, only triggered (activated) sensors are active, i.e., an activity at the site causes a triggering effect and activates the sensor, and only the signals generated thereby are transmitted to the security station. In such a system, multiplexing of continuous signals is not nearly as critical. The "time-stamp" is particularly useful as an aid in reconstructing the events in a "post event" investigation.

**(9.) Please amend paragraph 34, page 10 as follows:**

*A9* [0034] In one embodiment, the system includes a plurality of strategically located video image sensors and/or audio sensors, each sensor adapted for transmitting the signals to a

**A9** multiplexer for distributing the signals to monitors and/or archival recorders. The data multiplexer combines all of the signals from the various detector circuits to provide a data stream suitable for transmission over the wireless system.

**(10.) Please amend paragraph 81, page 18 as follows:**

**A10** [0081] The system may also be programmed to periodically poll the various sensor systems to routinely check the status of the systems and the assets under their supervision, as better illustrated in Fig. 2. The start asset update function 830 may be an automatic sequence or may be manually initiated. With the first step being to define the asset N to be monitored during the sequence, as at 832. As shown at function block 834, the system is set to poll the various assets in sequential or programmed order. Once the asset is selected at 834, the poll is transmitted to the asset at 836 and the system is set to wait for and receive the response see 838 and 840, respectively. The poll includes all of the strategic ground based sensor systems as well as the onboard systems. The polled information is stored in an archive file for providing a periodic log of the status and location of the asset at any time during its presence in the supervised zones, see 842. Where a response is required, the responding information is stored as indicated at 846. As each asset poll is completed, the system is sequenced at 848 to poll the next asset.

**(11.) Please amend paragraph 84, page 20 as follows:**

**A11** [0084] The event mapping function is demonstrated in Fig. 4, and the event closing mapping function is demonstrated in Fig. 5, respectively. Turning first to Fig. 4, the process event update sequence 880 is initiated when an event occurs. If the event is a fire as indicated in Fig. 6, an appropriate icon for indicating a fire is selected at 882 and the position is determined based on the location data as indicated at function 884. The icon is then placed on the system map as indicated at 886, with appropriate information attached, see 888. This allows all personnel and assets, as well as control centers to monitor the location, response and handling of the event during its life cycle. The mapping function continually updates this and other events by the return loop indicated at 889.

**(12.) Please amend paragraph 89, page 21 as follows:**

*A12* [0089] Fig. 7 is an illustration of a basic ground based security and surveillance system for aircraft. The aircraft 10, 10a, 10b...10n will be within the view of video sensors or cameras 210, 210a...n when on the airport ramp. The video processor/compressor can also be used to perform still image compression to reduce the amount of data required to be transmitted over the network. This can be accomplished by using any suitable image compression algorithm, such as the industry standard JPEG algorithm, wavelet compression, DjVu from AT&T, or other techniques. For full motion video surveillance applications, the compressor may be used to provide bandwidth reduction motion video transmissions. In this application, the amount of data representing a full motion video stream would be reduced by using full motion video compression techniques such as Motion JPEG compression, MPEG compression, motion wavelet compression, or other techniques. This allows better bandwidth utilization of the wireless and wired communications channel used by the system.

**(13.) Please amend paragraph 96, page 24 as follows:**

*A13* [0096] As shown in Fig. 11, the camera system includes a base or mounting bracket 56 for mounting the system at location. The system body 52 is mounted on a tilt mount 54 (y-axis) and pan mount 50 (x-axis), permitting panning (x direction) and tilting (y direction) of the camera for scanning a wide area. A motorized zoom lens 58 is provided (z direction). The preferred embodiment of the system also includes an audio sensor such as directional microphone 60. The audio sensor maybe an acoustic transducer, such as a microphone, that collects audio information from the surrounding area. The collected audio can be processed to detect potential emergency conditions such as a gunshot or an explosion, or can be routed directly back to the monitoring station. Using the sensors of the subject invention, locational origin of an explosion or a gunshot or the like can be triangulated from multiple sensors and the positional origin can be calculated and displayed on maps as an overlay for assisting in pursuit of a perpetrator. The calculated origin can also be correlated by computer to the nearest appropriate emergency assets, based upon their known positions, and those assets may be automatically dispatched. The audio analog/digital convertor adapts the acoustic signal representing the audio environment into a digital data stream. The digitizer runs at real-time rates for real-time audio monitoring. The audio signal processor/compressor has two functions. It is programmed to perform detection in a number of different manners. For example, the processor algorithms can

A13 be adjusted to detect impulse noises such as a gunshot or a small explosion. Detection of such an event would trigger a specified unique "alarm" for that condition to be transmitted back to other elements of the system. Other types of detection are also possible. By using frequency analysis transforms and signature profiles, noises from engines, door openings or other distinctive noises could be detected when warranted by the situation or condition. For audio surveillance applications, the compressor can also be used to provide bandwidth reduction for audio transmission. In this application, the amount of data representing a real-time audio stream would be reduced by using audio compression techniques such as LPC- 10, or other well-known or proprietary algorithms. This allows better bandwidth utilization of the wireless and wired communications channels used by the system.

**(14.) Please amend paragraph 98, page 25 through 27 as follows:**

A14 [0098] An integrated GPS receiver 64 is provided for generating location information. This is particularly useful for "drop-and-place" sensors as opposed to permanent sensors. Other features such as a laser range finder 66 that can measure distance to objects/personnel may be incorporated to further expand and enhance the capability of each sensor component. The camera system shown has full 360 degree field of view capability which may be controlled manually by remote control signals, may be programmed to pan the area on a time sequence, may track a moving transport using GPS signals from the transport or by using image processing "tracking software" processing the camera image, or may be responsive to and activated by an event occurrence such as from sensors distributed throughout the ramp areas, reporting activity over the LAN, in the well known manner. The range finder 66 permits the tracking system to locate objects in a precise manner and then provide control signals to permit accurate surveillance and monitoring of same, such as zooming the camera or positioning of other sensor elements. An onboard dual GPS system on the aircraft, with one GPS at the tail and one at the nose, used in conjunction with the GPS system 64 permits the system to determine size, heading and distance to the aircraft being monitored, providing accurate location information and permitting the camera to automatically adjust to monitor the entire aircraft within its range. This permits the selection of the correct camera when multiple cameras are available and permits a wide range of viewing possibilities by being able to determine what portion, if not all, of the aircraft is to be monitored at any given time. In those instances where the aircraft is equipped

*A14*

with a single GPS system, much of this versatility is preserved. However, it will be understood that aircraft size then would have to be determined from the aircraft type or by optical means. When the transport is not equipped with the GPS system, the other sensors such as the range finder/tracking camera or ground level sensors would provide data for cameral selection and updating of electronic situational maps. Each sensor and/or camera may incorporate a motion sensor and/or an audio sensor activation device so that the system may be activated when a sound or a motion occurs within the sensor range. The motion detector may comprise any transducer unit that can detect the presence of an intruder and can be a device such as an infrared motion detector, a thermal sensor, an ultrasonic detector, a microwave detector, or any hybrid of two or more of these detectors "fused" together to gain better sensitivity and/or improved detection accuracy. A motion detector convertor may be incorporated to convert the signal from either a single motion detector sensor or a battery of sensors to digital form for processing and/or transmission to other system elements. Multiple elements may be contained within a single sensor system package, or may be fused for multiple sensors in geographically distributed elements with data to be fused being transmitted over the LAN. The motion detector signal processor is adapted for analyzing the sensor data streams from one or more sensors to provide for better sensitivity or improved detection accuracy. Well-known techniques may be implemented to process the transducer data and detect surges over the set thresholds that represent detection. The processor/compressor can also be configured to accept input from multiple sensors and process the inputs in a "fused" manner. For example, signals from an infrared detector and ultrasonic detector may be "added" together, then threshold detection performed. This ensures that both an optical and an acoustic return are detected before an alarm condition is broadcast. These and other more sophisticated well known techniques can be used together to gain better sensitivity and/or improved detection accuracy. Detection of such an event would trigger a specified, unique alarm condition to be transmitted back to the other elements of the system.

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**(15.) Please amend paragraph 102, page 28 as follows:**

*A15*

[0102] As shown in Fig. 12, permanent ground units may be hardwired in a typical wired LAN system configuration, with a single wireless LAN transceiver 212 serving the permanent ground base portion of the system. Depending on convenience of application, it will be readily

*A15*  
understood that any combination of wired or wireless component configurations can be utilized. For example, if the maintenance hangar 214 were a great distance from the ground surveillance center at tower 216 a wireless (RF or optical) LAN communication link may be preferred over a hard-wired system. Use of the wireless LAN will also greatly facilitate the adaptation and retrofitting of airports not having ready cabling capability or infrastructure.

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**(16.) Please amend paragraph 107, page 30 as follows:**

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*A16*  
[0107] The use of the dual GPS receivers 200, 202 on the aircraft 10 permits the reporting of the general location of the aircraft on the ramp during taxi when parked whether or not attended. The use of two GPS receivers provides redundancy, better accuracy and orientation information for the aircraft by reporting two distinct position datum signals. It will be readily understood by those skilled in the art that other position signal devices could be utilized such as, by way of example, a single GPS receiver and a magnetic compass (which may have to be corrected for local magnetic fields or interference). By linking the position and orientation information to the ground based centers the location and orientation of the aircraft at all times it is on the ground the aircraft may be closely monitored. Such a system provides ground control transmitting signals showing the location and movement of all aircraft while on the ground, in much the same manner the radar transponders provide air controllers with position and movement data while the aircraft is airborne. This is particularly desirable when the movement of aircraft is portrayed on a map display. Other ground vehicles such as fuel trucks, waste water trucks, baggage handling trains, security vehicles and the like can also be tagged with GPS receivers and LAN transceivers for monitoring their position relative to the aircraft on the ramp. An automated computer system can be operating in the background looking for potential collisions and generating alarm messages if such conditions are detected. Another automated computer function can track vehicles relating to their authorized areas and issue alarms if security is breached. Yet another function can track the presence or absence of needed services, such as the timely appearance of catering trucks, fuel trucks, wastewater trucks, baggage trains and the like after the arrival of a subject transport. If any of these required services do not arrive at the transport within a prescribed time period, and "alarm" can be reported over the LAN to the missing services vehicle, and/or to the responsible operations center. This function can be completely automated by a controlling computer system.

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**(17.) Please amend paragraph 108, page 31 as follows:**

**[0108]** As shown in Fig. 14, in a typical installation, external sensors 210a-n are placed on the ramp in the vicinity of the aircraft to monitor the exterior of the aircraft. For example, a plurality of video cameras 210a and 210b may be placed along the exterior fence 300 of an airport. In addition, cameras may be placed in other strategic locations such as the camera 210c mounted on the terminal building 310 and the remote cameras 210d-n mounted on base units 312 located strategically throughout the airport. When an aircraft 10 is parked on a surveyed area of the airport ramp 314, the various cameras 210a-n and or other ground based sensors will provide a secure area for the aircraft. Any activity within the range of the cameras may be viewed and monitored.

**(18.) Please amend paragraph 111, page 31 as follows:**

**[0111]** Audio and video monitors are also provided at the base security station to provide near real-time surveillance. The flight deck monitor and control panel 54, located on the control panel in the cockpit 21, will also have access to this information. Other monitors may be provided where desired.

**(19.) Please amend paragraph 114, page 32 as follows:**

**[0114]** As shown in Fig. 16, the use of a wireless network provides maximum versatility in the transmission of information and the monitoring and processing capability provided by the system. As indicated in Fig. 16, the transport 10 both sends and receives information between the ground station 18, as previously described and as indicated by the wireless data path A. The transport may also transmit and receive between the fixed sensor station(s) 20 as indicated by wireless data path C. The fixed sensor station is also in direct communication with the ground station as indicated by wireless data path D. It should be understood that permanent installations such as the ground station and the fixed sensor station could be hardwired with one another without departing from the scope and spirit of the invention. In addition, support vehicles such as, by way of example, the baggage train 13 may be equipped with sensors such as location sensors and the data generated by this sensor may be transmitted to the ground station via path B, the monitor station via path E and directly to the transport via path F. The ground station 18, monitor station 20 and transport 10 may also communicate directly with the ground support

*A19*  
vehicle 13. For example, if the ground support vehicle comes within a designated "keep-out" or no trespassing zone or is too close to the transport, a proximity sensor or calculation from the GPS data may be utilized to activate and send a warning signal to the ground support vehicle. As indicated by wireless path G, sensor data may also be communicated between multiple transports 10 and 10a.

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**(20.) Please amend paragraph 115, page 33 as follows:**

*A20*  
[0115] The comprehensive system of the subject invention not only provides surveillance of the aircraft while at the gate or while unattended, but also provides taxi protection and monitoring. As shown in Fig. 17, when all ground vehicles such as fuel truck 11 and baggage train 13 are outfitted with GPS receivers as well as the aircraft 10, the location and safe distance of each vehicle and the aircraft may be monitored. "Train" type vehicles may be outfitted with two or more GPS receivers to relay the length of the vehicle. Each car can have a separate module. A computerized map of the airport tarmac T, the taxiways P and runway R can be generated showing the position, direction and movement of each vehicle and the aircraft. Predefined "keep-out" zones "Z" may be established and an alarm may be sounded if the zones are breached. Also, prescribed areas for authorized vehicles may be established and monitored. If a vehicle is outside the designated area, or breaches a zone "Z", an alarm condition will result. This can be prioritized as a cautionary breach, a dangerous breach and so on, depending on proximity of the various vehicles and aircraft to one another. For example, if an aircraft 10 comes too close to a fuel truck 11, alarms in the aircraft[,] and the fuel truck will be activated. If the situation advances to a danger zone, a second alarm condition may alert ground or base personnel that a breach has occurred so the intervention may be initialized. Logging of the "safety" breaches can be made so that safety improvements or training may be implemented based on need.

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**(21.) Please amend paragraph 116, page 33 as follows:**

*A21*  
[0116] A combination of ground sensors in a matrix on the airport ramp (see sensors 210a-210n in Fig. 14) will scan and monitor vehicles. If a vehicle is detected that does not have a GPS identification authorized for that location an alarm condition will result. For example, if a stray baggage train 13 entered the taxiway area, an alarm would sound indicating that the train

A21 13 has entered an unauthorized area. Emergency and security personnel may also be alerted and dispatched if unauthorized or untagged (no GPS identifier) vehicles are present. This protection scheme could be expanded to include personnel as well as vehicles. For example, the ground vehicle can have a sensor that reads a personnel security token or device such as an encoded digital key. This key information would enable the vehicle and would also be encoded with GPS information and vehicle identification, which is transmitted over the LAN. Security software can then check to determine if the individual is authorized to be present in the vehicle at that time and location, activating an alarm if proper authorization is not confirmed. The vehicle could also be immediately shut down. Visual identification of personnel may also be accomplished using the sensor systems of the subject invention.

**(22.) Please amend paragraph 122, page 36 as follows:**

A22 [0122] Where desired, a light level detector may be used for detecting light conditions such as the ambient lighting or transient conditions such as vehicle headlights or a flashlight. The light detector analog/digital convertor adapts the ambient light levels into a digital data stream. This digitizer runs at rear-time rates for teal-time illumination monitoring. The light detector signal processor can be programmed to look for profiles such as rapidly increasing light conditions that may indicate a vehicle or a flashlight as opposed to the rising or setting sun. Detection of such an event would trigger a specified unique alarm condition to be transmitted back to other elements of the system.

**(23.) Please amend paragraph 124, page 36 as follows:**

A23 [0124] An audible speaker system can also be provided in the preferred embodiment and can provide numerous audio outputs such as, by way of example, voice output or a siren. This is a multi-function device and can be activated by local detection events, and by other system elements such as detection by a companion sensor unit signaling over the wireless system. The siren can indicate an area of concern, serve as a signal to security personnel and/or scare away intruders. The audible speaker can also be used to provide voice instructions or signals based on local detection events, and by other system elements. The controller produces the synthesized or stored voice signals. The controller can be programmed or downloaded over the wireless system. The speaker system can also be used as a paging system by sending digitized or